THE new regulations recently issued by the War Office, under which commissions in the Army may be obtained by university candidates, provide that commissions shall be allotted each half-year to the University of London. To satisfy the requirements of the regulations, the Senate has appointed a nomination board for military commissions which will nominate qualified students for commissions, and arrangements have been made for the instruction of candidates in military subjects. To be eligible for a commission, a candidate must have graduated as an internal student, and this involves three years' study at one or more of the schools of the university. Before a student can be nominated for a commission he must, as a rule, have attended the various courses of instruction in military subjects in the university, and he must have been attached for two periods of six weeks, or for one period of twelve weeks, to a regular unit. Courses of lectures in military subjects are being given at the University of London by Colonel H. A. Sawyer, P.S.C., and Lieut.-Colonel F. N. Maude, P.S.C., late R.E.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 23.—"Two Cases of Trichromic Vision." By Dr. F. W. **Edridge-Green.** Communicated by Dr. F. W. Mott, F.R.S.

One case (Prof. J. J. Thomson) sees only three colours in the bright spectrum—red, green, and violet. He can distinguish nothing of the nature of pure yellow, like the sensation given him by the sodium flame, in the spectrum. There is no definite colour to him at the portion of the spectrum where the normal sighted see pure blue. Reddish-green would describe the orange and yellow regions and greenish-violet the blue. λ 5950 (orange-yellow) is the point which differs most from red and green. There was no shortening of either end of the spectrum.

Difference of Hue Perception.—The author then tested him with his apparatus for ascertaining the size of different parts of the spectrum which appear monochromatic, and found him defective in distinguishing differences of hue.

Colour Mixtures.—Tested with Rayleigh's apparatus for matching spectral yellow by a mixture of red and green, the mixed colour of his match always appeared green to the author.

Classification Test.—Only a few colours were selected in each case. On being asked to pick out all the yellows he chose those with orange in them. He had considerable difficulty in matching the colours. In common with the cases previously observed, the effects of simultaneous contrast were much more marked than in the normal sighted. Two wools changed colour to him on being contrasted, when no change was evident to the author.

Lantern Test.—He correctly named the red, green, and violet with and without the neutral glasses, and saw them at the normal distance. He had difficulty with yellow and blue. He called pure yellow "greenish yellow."

The other case is that of Mr. P. S. Barlow, a research student in the Cavendish Laboratory, and was similar in most respects to the above.

The author uses the term trichromic as a statement of the fact that persons having this vision see only three colours in the bright spectrum, whilst the normal sighted see six, and may, therefore, be designated hexachromic. It is probable that the appearance of the bright spectrum to the trichromic is very similar to that of a spectrum of feeble luminosity to the normal sighted, in which only three colours—red, green, and violet—are seen. The defective difference perception which is found in these cases accounts for most of the facts. Both these cases are bordering on the tetrachromic, as the sodium flame appears to give rise to a distinct sensation.

March 2.—"Atmospheric Electricity in High Latitudes." By George C. **Simpson,** B.Sc. Communicated by Arthur Schuster, F.R.S.

This paper is an account of a year's work on atmospheric electricity undertaken at Karasjok, Norway, from October, 1903, to October, 1904, with the results of a month's observations on atmospheric radio-activity made at Hammerfest.

Karasjok is situated well within the Arctic Circle (69° 17′ N.), and during the winter has a severe Arctic climate, so that it is well situated for finding the influence of meteorological elements and the presence or absence of direct sunlight on the electrical conditions of the atmosphere.

The observations were limited to determinations of the potential gradient, electrical dissipation, atmospheric ionisation, and atmospheric radio-activity. A continuous record of the potential gradient was obtained by means of a Benndorf self-registering electrometer, and measurements of the dissipation and ionisation were made three times each day unless the weather made it impossible to use the instruments. Measurements of the radio-activity were made between the hours of 10 to 12 a.m., 3 to 5 p.m., and 8.30 to 10.30 p.m. on 253 days, and in addition 42 measurements were made between 3 and 5 a.m. The results of the work are shortly as follows:—

YEARLY VARIATION. *Potential Gradient.*—The yearly course was found to be in accordance with the general rule for the northern hemisphere—rising rapidly from October to February, when it reaches a maximum, then falling more rapidly until the end of May, after which it remains constant until the winter sets in again during October. *Dissipation.*—The yearly course is exactly opposite to that of the potential gradient, the curves representing the two being almost mirror images of one another. *Ionisation.*—The course of the ionisation consists of a nearly linear six months' fall from the beginning of September to the end of February, followed by a similar six months' rise from March to the end of August.

DAILY VARIATION.—*Potential Gradient.*—The daily course for the whole year consists of a single period having a minimum about 5 a.m. and a maximum about 9 p.m. *Dissipation.*—For the whole year the dissipation is slightly higher at midday than earlier in the morning, while the evening observations show the lowest dissipation of the three. *Ionisation.*—The daily period of the ionisation is not so pronounced as that of the dissipation, but the ionisation is slightly lower in the evening than in the morning or at midday during the whole year.

RELATION BETWEEN THE METEOROLOGICAL AND ELECTRICAL CONDITIONS OF THE ATMOSPHERE.—*Wind.*—As is to be expected, the dissipation increases greatly with the wind strength. *Temperature.*—Both the ionisation and dissipation become much less as the temperature goes down. With temperatures between 10° C. and 15° C. the dissipation is 4·95 per cent. and the ionisation 0·44 per cent., while with temperatures below −20° C. these become 0·83 per cent. and 0·17 per cent. respectively. The potential gradient increases as the temperature falls. *Relative Humidity.*—With rising relative humidity the dissipation falls rapidly, and the ratio of negative to positive dissipation increases. When the whole year is taken into account, the same result is found for the ionisation; but for the winter and summer six months, taken separately, the effect of the humidity of the air on the ionisation is not apparent.

INTERRELATION OF ELECTRICAL FACTORS.—Both the dissipation and ionisation greatly influence the potential gradient. Low values of ionisation and dissipation are accompanied by high values of the potential gradient, and *vice versâ*. The dissipation increases with the ionisation.

THE AURORA AND THE ELECTRICAL CONDITION OF THE ATMOSPHERE.—No relation whatever could be detected between the aurora and the electrical conditions of the atmosphere. The most careful watching of the electrometer needle revealed no variation of the potential gradient with variations of the aurora.

RADIO-ACTIVITY.—Measurements of the radio-activity were made by Elster and Geitel's method, and their arbitrary unit was used in expressing the results. A most distinct yearly course of the radio-activity was found, the maximum, 129 (mean for month), falling in December, and the minimum, 47, in June. The radio-activity has also a very pronounced daily course, the maximum, 162 (mean for year), falling in the early hours of the morning, and the minimum, 58, about midday.

There is a distinct connection between the radio-activity and the meteorological conditions of the atmosphere; the radio-activity increases as the temperature falls, rises as

the relative humidity rises, decreases with increasing wind strength, and is greater with a falling than with a rising barometer. All these facts support Elster and Geitel's theory that the source of the emanation in the atmosphere is the soil of the ground. Those meteorological conditions which prevent the air immediately above the ground from ascending tend to increase the radio-activity; on the contrary, all those conditions which cause a rapid circulation of the air greatly reduce the radio-activity when measured in the lower atmosphere.

OBSERVATIONS AT HAMMERFEST.—The mean values of the radio-activity were found to be lower at Hammerfest on the coast than at Karasjok inland. The most important result of the Hammerfest measurements was the great difference between the radio-activity of the air from the sea and that from the land. The mean radio-activity with a wind from the sea was only 6, while with a land breeze the mean was 72.

March 16.—"A New Radio-active Element, which Evolves Thorium Emanation." Preliminary Communication. By Dr. O. **Hahn.** Communicated by Sir William Ramsay, K.C.B., F.R.S.

The radio-active preparation was gained from barium radium bromide, obtained from thorianite from Ceylon, while fractionating it in order to separate the radium. It collected along with small traces of iron and other impurities in the more soluble portions, and was precipitated by ammonia. From this preparation a quantity of about 10 mg. of a strongly radio-active oxalate was obtained, giving off a strong emanation and imparting bright luminosity to sensitive screens. The emanation was found to be identical with that of thorium; different samples gave for the half-period of decay from 52 to 55 seconds. For the half-period of the induced activity somewhat more than 11½ hours was found. The emanation given off by the 10 mg. of the oxalate, dissolved in hydrochloric acid, corresponds in intensity to more than that of a kilogram of thorium in solution; consequently it was more than 100,000 times stronger than the common thorium emanation when compared weight for weight. Further work led to the separation of about 20 mg. of a substance giving nearly 250,000 times more emanation than thorium.

Whether this active substance is the constant radio-active constituent of thorium preparations, or whether it is another new radio-active element, remains still undecided. It is hoped that an even more strongly radio-active product may be obtained, and that it may be possible to describe more in detail the properties of the substance.

Recent researches would appear to show that the amount of this substance in soil is comparable with, but still considerably smaller than, radium.

March 30.—"The *Rôle* of Diffusion in the Catalysis of Hydrogen Peroxide by Colloidal Platinum." By Dr. George **Senter.** Communicated by Sir William Ramsay, K.C.B., F.R.S.

The deviations from the simple logarithmic formula in the catalytic decomposition of hydrogen peroxide by colloidal platinum are probably due to disturbances caused by convection currents. When the velocity-constant calculated on Nernst's diffusion hypothesis is great compared with the chemical velocity-constant, increased convection can produce no appreciable effect on the observed reaction-velocity.

In the case under consideration, therefore, since increased convection modifies the observed reaction-velocity, there must be some error in the assumptions which lead to the conclusion that the diffusion velocity-constant is great in comparison with the chemical velocity-constant. This error is probably to be found in the assumption that the whole surface of the platinum is, under ordinary conditions, active towards hydrogen peroxide.

It cannot be claimed, from the above considerations, that Nernst's hypothesis is true for the platinum catalysis, but only that the diffusion-velocity is not great in comparison with the chemical velocity. Other considerations, however, such as the small value of the temperature coefficient, make it probable that the above hypothesis does apply to this particular action. Further support for this view may, perhaps, be found in the fact that the deviations from the simple logarithmic law in catalysis by platinum have their exact analogy in the hæmase catalysis. On the "chemical" velocity hypothesis it would seem rather remarkable that two catalysers of so different origin should show exactly similar behaviour, but this becomes at once intelligible on Nernst's hypothesis, according to which the chemical action plays quite a secondary part in the reaction-velocities in question.

Mineralogical Society, March 15.—Prof. H. A. Miers, F.R.S., president, in the chair.—Description of the big diamond recently found at the Premier Mine, Transvaal: Dr. F. H. **Hatch** and Dr. G. S. **Corstorphine.** The stone weighed more than 1¼ lb., and its greatest linear dimension was 4 inches. It was part (probably less than half) of a distorted octahedral crystal.—On some new mineral localities in Cornwall and Devon: A. E. I. M. **Russell.** An account was given of various new finds of the minerals anatase, scheelite, wolframite, childrenite, apatite, and connellite.—On a crystal of phenakite from Africa: L. J. **Spencer.** This crystal, which was transparent and rich in faces, was brought back together with crystals of tourmaline, corundum, and amethyst, by the Rev. A. North Wood from the Usagara country in German East Africa.—Notes on various minerals from the Binnenthal, Switzerland: G. T. **Prior** and G. F. Herbert **Smith.** Further crystallographic and chemical details were given of the three new red minerals from the Binnenthal originally described by R. H. Solly, and named by him Smithite (after G. F. Herbert Smith), Hutchinsonite (after A. Hutchinson), and Trechmannite (after C. O. Trechmann). Smithite is a sulpharsenite of silver having the composition represented by the formula $AgAsS_2$; it is monoclinic with $a:b:c=2{\cdot}2205:1:1{\cdot}9570$, β 78° 40′. A perfect cleavage parallel to 100 distinguishes it from the other two red minerals. Hutchinsonite is rhombic with $a:b:c=1{\cdot}6356:1:0{\cdot}7540$. A prominent form is 140. Trechmannite is rhombohedral with $c=0{\cdot}7265$. The symmetry is the same as that of quartz.—On a new oxychloride of copper from Sierra Gorda, Chili: G. T. **Prior** and G. F. Herbert **Smith.** This new mineral, to which the name paratacamite was given, has the same chemical composition as atacamite, but begins to lose its water at a higher temperature than that mineral. It is pseudorhombohedral with $rr'=83°$ nearly. Twins about r are common. It displays optical anomalies, for minute fragments under the microscope are found to be biaxial.—On Dundasite from North Wales: G. T. **Prior.** The mineral was found by Mr. H. F. Collins in the Welsh Foxsdale Mine, Trefriw, Caernarvonshire; it occurs in white silky radiating tufts on cerussite with allophane; analysis showed it to be identical with Dundasite, hitherto known only from Dundas, Tasmania. A probable formula is $PbO.Al_2O_3.2CO_2.4H_2O$ or $PbH_2(CO_3)_2.Al_2.OH_6$.

Zoological Society, March 21. Mr. G. A. Boulenger, F.R.S., vice-president, in the chair.—*Exhibits.*—Photograph of a wounded Oryx (*Oryx beisa*) hiding in undergrowth of wood in its native haunts, in order to show the protective nature of the coloration of the animal: F. **Gillett.**—A series of pencil sketches of fishes of the Rio Negro and its tributaries made by Dr. A. R. Wallace about fifty years ago: C. Tate **Regan.**—Radiograph of a living snake showing the skeletons of two frogs it had swallowed some hours previously: M. **Yearsley.**—Skulls of the fallow deer (*Dama vulgaris*) and the red deer (*Cervus elaphus*) showing arrest of the growth of the antlers due to complete or partial castration: R. E. **Holding.**—*Papers.*—Effects of castration upon the horns of the prongbuck (*Antilocapra americana*): R. I. **Pocock.** The effects of the operation were curvature in growth, prevention of exuviation, and practical suppression of the anterior tyne.—The mammals and birds of Liberia: Sir Harry **Johnston,** G.C.M.G., K.C.B. Although Liberia was not marked off clearly by any natural features from either Sierra Leone on the one hand or the Ivory Coast on the other, it possessed a certain distinctness and a slight degree of peculiarity as regards its flora and fauna. As regards mammals and birds, Liberia was, to a great extent, a meeting-place for the forms of northern Guinea (Sierra Leone to the Gambia) and those of the Gold Coast, the Niger Delta, and the Cameroons. The species of

mammals peculiar to it included the dwarf hippopotamus, the zebra antelope, Jentink's duiker, and Büttikofer's monkey. The author enumerated eighteen species of mammals and twenty of birds, specimens of which had been obtained by various collectors in Liberia.—Abnormal remains of the red deer (*Cervus elaphus*): M. A. C. **Hinton.** The remains consisted of three antlers which were obtained from different post-Pliocene deposits in the south of England. They agreed in having all the tynes suppressed and in being supported upon very long pedicles, thus resembling in form, though much exceeding in size, those of the pricket. Rudimentary offsets were seen on the most perfect example, which proved the antler to be the third in the series. These antlers belonged to individuals who had suffered testicular injury at an early period of life, by which the characters of youth were retained for a longer period than was usual.—On the affinities of Procolophon: Dr. R. **Broom.** The author believed that reptiles in Permian times became specialised along two distinct lines, the one represented by the pareiasaurians, anomodonts, therocephalians, and theriodonts, and terminating in the mammals, the second giving rise to all the other reptilian orders. The common ancestor was believed to have been a true reptile probably belonging to the order Cotylosauria. Procolophon was held to be an early member of the branch which led to the rhynchocephalians, and possibly fairly closely allied to the land ancestor of Mesosaurus.—Skulls of the fossil reptile Procolophon from Donnybrook and Fernrocks: Prof. H. G. **Seeley.** The author concluded that the main affinities were with the Anomodontia, chiefly with the Pareiasauria, and in the teeth with the Theriodontia; but that in a less degree there were indications of affinity with reptiles classed as labyrinthodonts. All parts of the skeleton supported the separation of the Procolophonia as an order of extinct Reptilia.

Geological Society, March 22.—Dr. J. E. Marr, F.R.S., president, in the chair.—An experiment in mountain-building, part ii.: Lord **Avebury,** P.C., F.R.S. In this paper some experiments are described, which were conducted by an apparatus by means of which pressures could be applied in two directions at right angles to one another, a space of 2 feet square being reduced to one 22 inches square. In the first series, plastic materials, such as cloth and thin oilcloth, were used, with layers of sand between them. Two main folds crossing at right angles were formed, the upper one shifted over the lower. The use of two layers of linoleum produced a different type of folding, and the lower layers of the linoleum were broken along the principal ridges. In the second series, a layer of plaster was introduced; this was found to be fractured, tilted up into a "writing-desk" form, and forced irregularly into the sandy layers. Overthrusts were thus produced, so that in some cases a boring would have passed through two or even four layers of the rigid substance. In other cases, the edges of the primary fracture broke off more or less regularly, and the detached pieces were pushed up, assuming gradually a very steep angle. The remainder of the edges of the plate of plaster, having now room, were able to approach each other. Pliable material above the plaster was thrown into one or a few extensive folds, while that beneath assumed a greater number of small folds.—The Rhætic rocks of Monmouthshire: L. **Richardson.** The Rhætic rocks occur only in the neighbourhood of Newport, and the present paper describes three new sections and four new exposures.

MANCHESTER.

Literary and Philosophical Society, February 21.—Prof. H. B. Dixon, F.R.S., vice-president, in the chair.—Electrically-heated carbon tube furnaces: R. S. **Hutton** and W. H. **Patterson.** These furnaces are intended for experimental work, and not only enable extremely high temperatures to be attained, but with them the temperature, being under perfect control, can be kept steady at any value up to the maximum.

February 28.—Prof. W. Boyd Dawkins, F.R.S., president, in the chair.—The early history of seed-bearing plants, as recorded in the Carboniferous flora (Wilde lecture): Dr. D. H. **Scott,** F.R.S. (see p. 426).

March 7.—Prof. W. Boyd Dawkins, F.R.S., president, in the chair.—Two new aldehyde reactions: W. B. **Ramsden.**

March 21.—Prof. W. Boyd Dawkins, F.R.S., president, in the chair.—A new genus Nevillina, of the subfamily Miliolininæ, of the Foraminifera: H. **Sidebottom.**—On the temperature coefficient of electrical resistivity of carbon at low temperatures: H. **Morris-Airey** and E. D. **Spencer.** The method of taking observations at temperatures between the normal temperature and that of boiling oxygen was described, and the results plotted in the form of curves. The shape of the curves was discussed in connection with the theory that carbon conductors behave like loose powders.

PARIS.

Academy of Sciences, April 3.—M. Troost in the chair.—On the use of the hot and cold tube in the study of chemical reactions: M. **Berthelot** (see p. 568).—Observations on the new Giacobini comet made at the Observatory of Paris: G. **Bigourdan.** The observations were made on March 28 and 31; the positions of the comparison stars and apparent positions of the comet are given. On March 28 the comet appeared as a nebulosity of about the thirteenth magnitude, with a nucleus sensibly brighter than the rest. On March 31 the size had diminished, and the apparent brightness increased.—On the relation between the integrals of the total differentials of the first and second species of an algebraic surface: Émile **Picard.**—The variation of the band spectra of carbon with the pressure and some new band spectra of carbon: H. **Deslandres** and M. **d'Azambuja.** The kathode spectrum in air having shown peculiar variations with the pressure, it was thought desirable to study the effect of pressure upon the carbon spectrum. The negative spectrum of carbon is a band spectrum which appears at the kathode in the oxygen and hydrogen compounds of carbon, and is especially intense in the case of carbon monoxide and dioxide. Two spectra were photographed simultaneously on the same plate, one from a Geissler tube containing the gas at a pressure of about 0·2 mm., and the other from the kathode of a tube in which the pressure was capable of being varied up to nearly atmospheric. The variations noted strongly resemble those already studied for the negative spectrum of air. Details of a new spectrum of carbon dioxide, given by the kathode at a pressure of 30 cm. of mercury, are given.—On the grains found attached to *Pectopteris Pluckeneti*: M. **Grand'Eury.** In the search for fronds giving rise to fossil seeds, the author has found fronds of the above species to which are fixed, not one or two, but many hundreds of grains, proving that the fossil ferns of the Coal-measures, other than the Neuropterideæ, are gymnosperms, and must be placed among the Cycadeæ. Two reproductions of photographs of the fossils are given.—On the new Giacobini comet: M. **Giacobini.** The elements of the comet are given, calculated from observations made at Nice on March 26, 28, and 30.—The provisional elements of the Giacobini comet (1905, March 26): E. **Maubant.** The elements are calculated from observations made at Nice on March 26, and by M. Bigourdan at Paris on March 28 and 31.—Abel's theorem on algebraic surfaces: Francesco **Severi.**—On linear differential equations of the second order with a periodic solution: Maxime **Bôcher.**—On a hyperelliptic surface: E. **Traynard.**—On the dynamics of the point and the invariable body in an energy system: Eugène and François **Cosserat.**—On the properties of tungstic anhydride as a colouring material for porcelain: Albert **Granger.** The yellow enamel was obtained by heating with tungstic anhydride at 800° C., using lead monosilicate as a flux. With the addition of bismuth oxide this colour withstood firing well. The conditions under which these colours tend to become opaque have not been fully worked out, and work is being continued by the author in this direction.—On the production of the hyposulphites: M. **Billy.** The production of sodium hyposulphites by the action of sulphur dioxide on sodium in presence of a neutral solvent has been claimed by a German patent, but the author's experiments have led invariably to a negative result. In presence of alcohol the reaction would appear to take place. By the introduction of sulphur dioxide into magnesium powder in suspension in

absolute alcohol, the metal dissolves, possibly as an acid hyposulphite. This solution, left in a vacuum, deposits magnesium hyposulphite.—On acetyl-lactic acid: V. **Auger.** Previous accounts of this substance being contradictory, the author has attempted to procure it in a pure state. It can be obtained either by the action of acetyl chloride on calcium lactate or on lactic acid, or by using acetic anhydride in the place of the acetyl chloride. The substance was obtained in a crystalline form in all three preparations, and its physical and chemical properties are given.—On the compounds of aluminium chloride with hydrocarbons and hydrogen chloride: G. **Gustavson.** By the interaction of benzene, isopropyl chloride, and aluminium chloride, the author has isolated a definite compound, the action of which, in the Friedel and Crafts reaction, may be compared to that of a ferment. This substance can unite both with hydrocarbons and hydrogen chloride.—On the hydrides of phenanthrene: Pierre **Breteau.** Previous work on the hydrogen addition compounds of phenanthrene has been carried out with the aid of hydriodic acid. The author has applied the Sabatier and Senderens reaction with reduced nickel, and in the present communication gives the results obtained with the hexahydride and octahydride of phenanthrene.—On the retrogradation of artificial starch: E. **Roux.**—The influence of the ethylene function in an active molecule: J. **Minguin.** With the view of throwing further light on the effect of the ethylene linkage on the rotation, the author has prepared amyl succinate, maleate, and fumarate, as well as the corresponding esters of bornyl alcohol, and has measured the rotatory power.—The constitution of the ligamentary ridge and the evolution of the ligament in existing Acephalæ analogous to the Rudistæ: R. **Anthony.**—Diagrams showing the ligament in section are given for *Unio Pictorum* and *Aetheria Caillaudi* at two ages.—Heterotypical mitosis in the Ascomycetes: René **Maire.**—On the possible *rôle* of slipping in metallogeny: L. **De Launay.** An application of the idea of *charriage* to a study of the continuity of metallic lodes.—On the existence of schists with graptoliths at Haci-El-Khenig, Central Sahara: G. B. M. **Flamand.** Specimens of schists bearing fossils, collected by Captain Cottenest, prove to be characteristically Silurian, and form the first definite proof of this system in the Central Sahara.—On the presence of the Middle and Upper Carboniferous in the Sahara: Emile **Haug.**—On an extraordinary halo observed at Paris: Louis **Besson.** This halo, which was observed at the Montsouris Observatory on March 26, besides the ordinary circle and parhelia of 22°, presented two abnormal coloured arcs, the angular measurements of which are given.

DIARY OF SOCIETIES.

THURSDAY, APRIL 13.

ROYAL SOCIETY, at 4.30.—On a New Type of Electric Furnace; with a Redetermination of the Melting Point of Platinum: Dr. J. A. Harker.—On Colour Vision by Very Weak Light: Dr. G. J. Burch, F.R.S.—(1) The Improved Electric Micrometer; (2) The Amplitude of the Minimum Audible Impulsive Sound: Dr. P. E. Shaw.—The Refractive Indices of Sulphuric Acid: Dr. V. H. Veley, F.R.S., and J. J. Manley.—On the Intensity and Direction of the Force of Gravity in India: Lieut.-Colonel S. G. Burrard, F.R.S.—A Quantitative Study of Carbon Dioxide Assimilation and Leaf-Temperature in Natural Illumination: F. F. Blackman and Miss G. Matthaei.

ROYAL INSTITUTION, at 5.—Synthetic Chemistry: Prof. R. Meldola, F.R.S.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Alternating Current Series Motor: F. Creedy.—Discussion of Mr. Bion J. Arnold's address to the joint meeting at St. Louis.

INSTITUTION OF MINING AND METALLURGY, at 8.—The Kedabeg Copper Mines: Gustav Köller.—Refining Gold Bullion and Cyanide Precipitates with Oxygen Gas: T. Kirke Rose.—Wood Gas for Power Purposes and Gas Generator: G. M. Douglas.—Notes on the Prestea District, Gold Coast Colony: P. Poore.—Notes on the New Dharwar Gold Field of India: R. O. Ahlers.—The Cause of Border Segregation in some Igneous Magmas: J. Park.

MATHEMATICAL SOCIETY, at 5.30.—On Irreducible Jacobians of Degree Six: P. W. Wood.—On Fermat's Numbers and the Converse of Fermat's Theorem: A. E. Western.—On the Strains that accompany Bending: Prof. A. E. H. Love.—Ordinary Inner Limiting Sets in the Plane or Higher Space: Dr. W. H. Young.

FRIDAY, APRIL 14.

ROYAL INSTITUTION, at 9.—The Law of Pressure of Gases below Atmosphere: Lord Rayleigh.

PHYSICAL SOCIETY, at 8.—On Ellipsoidal Lenses: R. J. Sowter.—(1) The Determination of the Moment of Inertia of the Magnets used in the Measurement of the Horizontal Component of the Earth's Field: (2) Exhibition of a Series of Lecture Experiments illustrating the Properties of the Gaseous Ions produced by Radium and other Sources: Dr. W. Watson, F.R.S.

ROYAL ASTRONOMICAL SOCIETY, at 5.—Value of Meteoric Radiants Based on Three Paths: W. F. Denning.—Determination of Longitude on the Planet Jupiter: G. W. Hough.—(1) Revised Elements of UY Cygni; (2) Revised Elements of Y Lyræ: A. Stanley Williams.—Further Note on Instrumental Errors affecting Observations of the Moon; in reply to Mr. Cowell's paper of June, 1904: H. H. Turner.—Reply to Prof. Turner's paper: P. H. Cowell.—Note on the Point Distributions on a Sphere; with Remarks on the Determination of the Apex of the Sun's Motion: H. C. Plummer.

MALACOLOGICAL SOCIETY, at 8.—Anatomical and Systematic Notes on Dorcasia, Trigonephrus, Corilla, Thersites, and Chloritis: Henry A. Pilsbry.—Some Account of the Anatomy of *Cassidaria rugosa*, L.: Alexander Reynell.—Notes on a small Collection of Shells from the Victoria Falls, Zambesi River: H. B. Preston.—Descriptions of Six New Species of Land Shells from South Africa: H. Burnup.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—President's Address. Conclusion of discussion on Steam-engine Research Report and Prof. Capper's reply.

SATURDAY, APRIL 15.

ROYAL INSTITUTION, at 3.—Some Controverted Questions of Optics: Lord Rayleigh.

MONDAY, APRIL 17.

INSTITUTE OF ACTUARIES, at 5.—On the Importance and Practicability of a Standard Classification of Impaired Lives: Dr. S. W. Carruthers.—Social Conditions as affecting Widows' and Orphans' Pension Funds: S. J. H. W. Allin.

TUESDAY, APRIL 18.

ROYAL STATISTICAL SOCIETY, at 5.

ZOOLOGICAL SOCIETY, at 8.30.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Annual General Meeting.

WEDNESDAY, APRIL 19.

GEOLOGICAL SOCIETY, at 8.—The Blea Wyke Rocks and the Dogger in North-East Yorkshire: R. H. Rastall.—Notes on the Geological Aspect of Some of the North-Eastern Territories of the Congo Independent State: G. F. J. Preumont; with Petrographical Notes: J. A. Howe.

ROYAL MICROSCOPICAL SOCIETY, at 8.—On the Application of the Undulatory Theory to Optical Problems: A. E. Conrady.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—An Account of the Observations at Crinan in 1904, and Description of a new Meteorograph for use with Kites: W. H. Dines.—Rate of Fall of Rain at Seathwaite: Dr. H. R. Mill.

CHEMICAL SOCIETY, at 5.30.—Complex Nitrites of Bismuth: W. C. Ball.

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